16 June 2008

Saclay Drift Chambers - Operating instructions

1. General

Three Drift Chambers (DCs) detectors are in use: DC0, DC1 and DC4.

The DC0 and DC1 detectors are identical; each detector has an active area of 127x 180 cm^2 and consists of 8 layers of sensitive wires (X, X', Y, Y', U, U', V, V'). The total gas volume per detector is ~250 l. The DC4 detector has also 8 layers of sensitive wires. However, its active area is larger: 248x208 cm^2. DC4 has a total gas volume of ~700 l. All detectors are fully efficient at operating voltages of about 1700 - 1750 V.

All DCs use the same gas mixture: Ar(45%), C_2H_6(45%) and CF_4(10%).
The gas flow and mixture for all three DCs is set via the touch screen of the PLC3, located in the Gas Area.

The HVs are set using the Saclay Slow Control software (Saclay barrack, on top of the Gas Area).

Phones : -Saclay 'on call' : 16 0731
-A.Magnon : 16 3943

2. Start-up of DCs operational gas flow

- **a.** Make sure that all gas pipes are connected. (This should be the default situation during both beam time and winter shutdown).
- **b.** Purge detectors with Argon (changing 4 times the chamber volume requires 5 days for DC0/DC1 and 14 days for DC4).
- **c.** Perform leak test for all 3 detectors, using Argon gas only. The leak test has to be made at least once per year, before the run.
- **d.** Open the MM/DC ethane valve in flammable gas arrival rack. (Check whether the MMs detectors are also ready – they share the same valve!)
- **e.** Set the ethane fraction to 45 % in PLC3 (See PLC3 instructions on next page).
- **f.** Set the CF_4 fraction to 10%.
- **g.** Changing 4 times the chamber volume requires 5 days for DC0/DC1 and 14 days for DC4.

Note: High Voltage must be turned ON only after the gas mixture is close to nominal.

3. Purging flammable gas and shut-down of DCs

- **a.** Set High Voltage OFF (Slow Control commands are in the COMPASS control room or Saclay barrack).
- **b.** Set the ethane fraction from 45 to 0% in PLC3. (See PLC3 instructions on next page).
- **c.** Set the CF4 fraction to 0% in PLC3. (See PLC3 instructions on next page).

d. Close the MM/DC ethane valve in flammable gas arrival rack (if MMs detectors have also been prepared for this operation).
e. Purge completely all 3 chambers with Argon : changing 4 times the chamber volumes takes 5 days for DC0/DC1 and 14 days for DC4.

4. Operation

a. DCs gas flows and mixtures are controlled by PLC3 and by the bubblers in the MM/DC gas rack.
b. DCs High Voltage and threshold settings are controlled by the COMPASS slow control. For Slow Control commands go in the Saclay barrack.
c. Check the 3 DC bubblers twice per shift. Normal bubbling is in the range: 0.3-0.6 Hz.

5. PLC3 operation

a. On the touch screen: select DC
b. Push the MENU button
c. Push the R4 box in order to enter the password.
d. Type the password: 6535 and then push ENTER.
e. Push the ESC button
f. Select the R1 button (Ethane proportion). This proportion is either 0 (no flammable gas) or 45 (during data taking). Note: equalizing the fluxes may need to slightly change the 45% value.
g. Change also the CF4 proportion (if needed).
h. Push the ESC button and check that the both Ar and Ethane flows are equal. If not adjust the Ethane proportion 45%±2%